Indicator: Threatened and Endangered Species (354)

Congress enacted the Endangered Species Act (ESA) in 1973 to protect endangered and threatened species and the ecosystems on which they depend. The ESA combined and strengthened the provisions of earlier laws, enacted in 1966 and 1969, which provided for a list of endangered species but gave them little meaningful protection.

Under the ESA, a species is considered *endangered* if it is in "danger of extinction throughout all or a significant portion of its range" and *threatened* if it is "likely to become endangered in the foreseeable future." To receive protection under the ESA, a species must be formally listed as threatened or endangered. A species can be simultaneously listed as both threatened and endangered if it is threatened in one part of its range and endangered in another. All species of plants and animals, except pest insects, are eligible for listing.

The decision whether to list a species follows a strict legal process administered by the U.S. Fish and Wildlife Service (USFWS) for terrestrial and freshwater organisms and the National Marine Fisheries Service (NMFS) for marine species. Evaluation of a species as threatened or endangered is based on five factors:

- Is there a present or threatened destruction, modification, or curtailment of the species' habitat or range?
- Is the species subject to overutilization for commercial, recreational, scientific, or educational purposes?
- Is disease or predation a factor?
- Are existing regulatory mechanisms inadequate to protect the species or its habitat?
- Are there other natural or manmade factors affecting the species'survival?

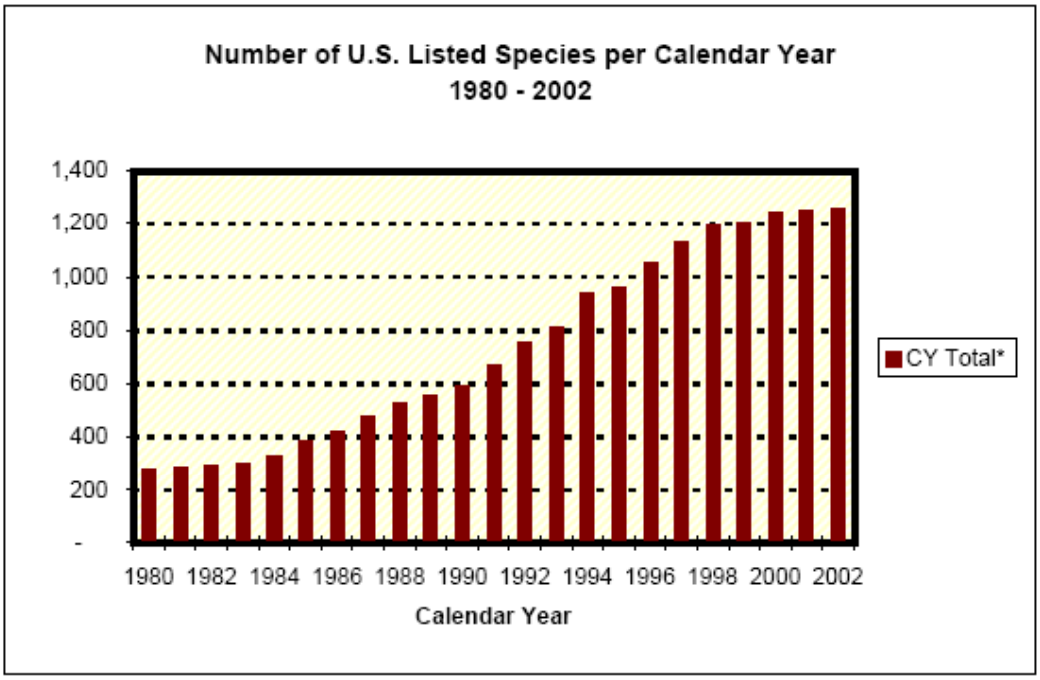
In most cases, the USFWS or NMFS initiates the listing process based on data the agency has collected. In some cases, citizen petitions provide the initial evidence leading to process initiation. The process involves collecting and carefully considering the "best scientific and commercial data available." Listings are made solely on the basis of a species' biological status and threats to its existence. External parties (including the scientific community, state and federal agencies, tribal governments, and the public) provide input and data via public comment and testimony. The USFWS or NMFS decides all listings using sound science and peer review to ensure the accuracy of the best available data. A final ruling on a species' status is required within one year of a species proposal for listing.

The ultimate goal of the ESA is to recover species so they no longer need protection. The status of each listed species is reviewed at least every 5 years to determine if federal protection is still warranted. Species may be delisted (removed from the list altogether) or downlisted (reclassified from "endangered" to "threatened") if threats have been reduced and the population has met its recovery objectives. As of December 31, 2002, 30 species had been delisted. Stresses causing species to be listed include habitat destruction, pollution, introduction of competing non-native species, introduction of exotic diseases and parasites, and commercial exploitation. Therefore, the number of species listed serves as a general indicator of environmental stress.

This indicator is based on USFWS data on the number of species listed each calendar year from 1980 to 2002. The total for each calendar year includes the number carried over from the prior year, as modified during the calendar year by new listings, reclassifications, delistings, new information on taxonomy, and other factors. Species with dual status (i.e., listed as both threatened and endangered) are counted only once. Also, subunits of a single species (e.g., salmon) that have been listed separately as distinct segments are counted only once. A current listing of endangered and threatened species in the United States can be

found at the Fish and Wildlife Service's Web site: http://endangered.fws.gov/wildlife.html#Species. The list is updated daily.

What the Data Show



The total number of endangered and threatened species listed in the United States has increased steadily over the 23 years from 1980 to 2002 (Figure 354-1). In calendar year 2002, the total number of species listed as endangered or threatened in the United States was 1,263.

Indicator Limitations

- Not all species on the ESA list are endangered or threatened due to anthropogenically induced stresses. A species can become endangered or threatened due to natural factors. Some species are listed because they have a similarity of appearance to an endangered or threatened species
- The 1973 ESA has been amended on several occasions, most recently in 1988. Some amendments may impact listing activities, possibly causing inconsistencies in listing decisions. For example, a 1982 amendment specified that determinations of species' status were to be made solely based on biological and trade information, without any consideration of possible economic or other effects. The level of appropriation may influence the ability of the USFWS and NMFS to consider species for listing, and thus may affect the number of new species listed each year.
- The ESA was due for reauthorization in 1993, but legislation to reauthorize it has not yet been enacted. Appropriations have continued while Congress considers reauthorization. However, should appropriations cease, then data for this indicator will no longer be available.
- Some listings and delistings result from court orders and other administrative actions.

Data Source

United States Fish and Wildlife Service's Endangered Species Program website: http://endangered.fws.gov/stats/cy_count2002.pdf

R.O.E. Indicator QA/QC

Data Set Name: THREATENED AND ENDANGERED SPECIES
Indicator Number: 354 (119178)
Data Set Source:
Data Collection Date:
Data Collection Frequency:
Data Set Description: Threatened and Endangered Species
Primary ROE Question: What are the trends in the diversity and biological balance of the Nation's ecological systems?

Question/Response

T1Q1 Are the physical, chemical, or biological measurements upon which this indicator is based widely accepted as scientifically and technically valid?

This indicator is not based directly on measurements, but rather on determinations made by federal agencies following a process. The Endangered Species Act of 1973 requires the U.S. Fish and Wildlife Serve (USFWS) and the National Oceanic and Atmospheric Administration's (NOAA's) National Marine Fisheries Service (NMFS) to make biological decisions based upon the best scientific and commercial data available. These decisions involve listing of a species as endangered or threatened, reclassification, and delisting of plant and animal species, and critical habitat designations. The process involves the active solicitation of comments on proposed listing rules and draft recovery plans by the scientific community, state and federal agencies, tribal governments, and other interested parties, including comments on the general information base and the assumptions upon which USFWS and NMFS are basing a biological decision. USFWS and NMFS also solicit expert opinions and analyses on specific questions or assumptions. This solicitation process may take place during a public comment period on any proposed rule or draft recovery plan, during the status review of a species under active consideration for listing, or at any other time deemed necessary to clarify a scientific question. In addition, independent peer review is solicited on listing recommendations and draft recovery plans to ensure the best biological and commercial information is being used in the decision-making process, as well as to ensure that reviews by recognized experts are incorporated into the review process of rulemakings and recovery plans developed in accordance with the requirements of the Endangered Species Act. The Interagency Cooperative Policy for Peer Review in Endangered Species Act Activities is available in its entirety at: http://endangered.fws.gov/policy/pol003.html.

T1Q2 Is the sampling design and/or monitoring plan used to collect the data over time and space based on sound scientific principles?

As stated in T1Q1, the Endangered Species Act of 1973 requires USFWS and NMFS to make listing decisions based upon the best scientific and commercial data available. See http://endangered.fws.gov/policy/pol003.html. Data are held at the field offices of the Fish and Wildlife Service Ecological Services Program, but are not usually available to the public.

T1Q3 Is the conceptual model used to transform these measurements into an indicator widely accepted as a scientifically sound representation of the phenomenon it indicates?

For this indicator, the data (number of species listed each year) are presented without transformation. Regarding how USFWS and the NMFS evaluate the scientific data to make a

listing determination, see T1Q1 for a general description of the process. For more information, contact USFWS. Contact information is available at: http://endangered.fws.gov/contacts.html.

T2Q1 To what extent is the indicator sampling design and monitoring plan appropriate for answering the relevant question in the ROE?

There is no single uniform sampling design or monitoring plan for all species considered for listing or delisting.

T2Q2 To what extent does the sampling design represent sensitive populations or ecosystems?

Although there is no uniform design, the data upon which decisions are made specifically target species that are or may be threatened or endangered.

T2Q3 Are there established reference points, thresholds or ranges of values for this indicator that unambiguously reflect the state of the environment?

USFWS and NMFS apply the following criteria, based on the best available biological and commercial data, in deciding whether to list a species as endangered or threatened: (1) the present or threatened destruction, modification, or curtailment of the species habitat or range; (2) overutilization for commercial recreational, scientific, or educational purposes; (3) disease or predation; (4) the inadequacy of existing regulatory mechanisms; or (5) other natural manmade factors affective the species survival. (See http://endangered.fws.gov/listing/listing.pdf.) No information is available on the USFWS website about how these criteria were developed or how they are applied.

T3Q1 What documentation clearly and completely describes the underlying sampling and analytical procedures used?

USFWS and NMFS receive and use information on the biology, ecology, distribution, abundance, status, and trends of species from a wide variety of sources as part of their responsibility to implement the Endangered Species Act. Some of this information is anecdotal, some of it is oral, and some of it is found in written documents. These documents include status surveys, biological assessments, and other unpublished material from state natural resource agencies and natural heritage programs, tribal governments, other federal agencies, consulting firms, contractors, and individuals associated with professional organizations and higher educational institutions. USFWS and NMFS also use published articles from juried professional journals. The quality of the information contained in these sources can be as variable. As part of their routine activities, USFWS biologists are required to gather, review, and evaluate information from these sources prior to undertaking listing, recovery, consultation, and permitting actions. Further information on ESA information standards can be found online at: http://www.nmfs.noaa.gov/prot_res/readingrm/recoverguide/infostds.PDF

T3Q2 Is the complete data set accessible, including metadata, data-dictionaries and embedded definitions or are there confidentiality issues that may limit accessibility to the complete data set?

All endangered and threatened species lists are available on USFWS Threatened and Endangered Species database System, which can be accessed at: http://endangered.fws.gov/wildlife.html. All lists and reports are updated on a daily basis. Regarding the data used to determine the endangered or threatened status of the listed species, none of this data is provided on the USFWS website.

T3Q3 Are the descriptions of the study or survey design clear, complete and sufficient to enable the study or survey to be reproduced?

Data are held at the field offices of the Fish and Wildlife Service Ecological Services Program, but are not usually available to the public to protect species locality and private landowner interests.

T3Q4 To what extent are the procedures for quality assurance and quality control of the data documented and accessible?

Standards for information and peer review can be found at the following website: http://www.nmfs.noaa.gov/prot_res/readingrm/recoverguide/infostds.PDF http://www.nmfs.noaa.gov/prot_res/readingrm/recoverguide/peerrvw.PDF General information quality guidelines for the USFWS are available at: http://www.noaanews.noaa.gov/stories/iq.htm General information quality guidelines for NOAA are available at: http://www.fws.gov/informationquality/topics/FWS%20Information%20Quality%20Guidelines.pdf

T4Q1 Have appropriate statistical methods been used to generalize or portray data beyond the time or spatial locations where measurements were made (e.g., statistical survey inference, no generalization is possible)?

N/A.

T4Q2 Are uncertainty measurements or estimates available for the indicator and/or the underlying data set?

Not on the USFWS website.

T4Q3 Do the uncertainty and variability impact the conclusions that can be inferred from the data and the utility of the indicator?

See T4Q2 and T4Q4.

T4Q4 Are there limitations, or gaps in the data that may mislead a user about fundamental trends in the indicator over space or time period for which data are available?

"Not all species on the ESA list are endangered or threatened due to anthropogenically induced stresses. A species can become endangered or threatened due to natural factors. Also, some species are listed because they have a similarity of appearance to an endangered or threatened species." The 1973 ESA has been amended on several occasions, most recently in 1988. Some amendments may impact listing activities, possibly causing inconsistencies in listing decisions. " The level of appropriation may influence the ability of the USFWS and NMFS to consider species for listing, and thus may affect the number of new species listed each year. The scientists involved in determining a listing vary from one species to the next, as do the data they consider. Thus, inevitably, there may be inconsistencies in the decision-making process.